saving and exiting commands. When the user desires to configure fan speed control, they are presented with a window such as a fan speed setting interface 80 of Fig.6. The fan speed setting interface 80 comprises several slider bars for setting fan speed corresponding to configurable temperatures levels for each fan included in the cooling system, realizing a configurable multilevel fan speed control system. Control of other cooling algorithms can be provided by similar windows. With user interfaces 70 and 80 and other similar interfaces, a user can finely tune the present invention cooling system according to his or her specific needs.

In contrast to the prior art, the present invention provides a cooling system and methods for operation thereof that minimize fan noise while reducing power and maintaining allowable operating temperatures. Specifically, the present invention provides methods that relate changes in computer system vital temperature to changes in fan speed of one or more cooling fans, including a power supply cooling fan. A chipset interface is provided to measure the changes in vital temperature, calculate the corresponding fan speeds, and output a control signal to achieve these fan speeds. Thus, the preset invention realizes improvements in power consumption and fan noise.

Those skilled in the art will readily observe that numerous modifications and alterations of the device may be made while retaining the teachings of the invention. Accordingly, the above disclosure should be construed as limited only by the metes and bounds of the appended claims.

Claims

What is claimed is:

1. A method for controlling an operating temperature of a computer system, the method comprising:

monitoring a rotational speed of at least a cooling fan of the computer system, the rotational speed of the cooling fan being controlled by a fan power;

monitoring a vital temperature of the computer system; and

setting the fan power based on a change in the vital temperature; wherein when the change in the vital temperature is negative, the fan power is reduced to reduce the fan rotational speed; and when the change in the vital temperature is positive, the fan power is increased to increase the fan rotational speed.

2. The method of claim 1 wherein setting the fan power further comprises:

increasing the fan power by a first power when the vital temperature increases by a first temperature, the first power being directly proportional to the first temperature.

3. The method of claim 1 wherein setting the fan power further comprises:

decreasing the fan power by a second power when the vital temperature decreases by a second temperature, the second power being directly proportional to the second temperature.

4. The method of claim 1 wherein setting the fan power further comprises:

maintaining the fan power when the vital temperature increases and the vital temperature is below a set temperature;

maintaining the fan power when the vital temperature remains constant and the vital temperature is above the set temperature; and

decreasing the fan power by a third power when the vital temperature remains constant and the vital temperature is below the set temperature.

5. The method of claim 4 further comprising resetting the fan power to a fixed fan power corresponding to a fixed fan speed when the set fan speed differs from the fixed fan speed and the vital temperature differs from the set temperature by at least a predetermined amount.

6. The method of claim 1 further comprising detecting a cooling fan maximum rotational speed and a corresponding maximum fan power such that setting the fan power is according to a percentage of the cooling fan maximum rotational speed.

7. The method of claim 1 wherein the at least a cooling fan includes a CPU cooling fan of a CPU of the computer system and an auxiliary cooling fan of the computer system, and the vital temperature is obtained from an on-die thermal monitoring transistor of the CPU.

8. The method of claim 1 wherein the cooling fan is a power supply cooling fan of a power supply of the computer system, and the vital temperature is obtained from an on-die thermal monitoring transistor of the CPU.

9. The method of claim 1 wherein the at least a cooling fan includes a CPU cooling fan of a CPU of the computer system, an auxiliary cooling fan of the computer system, and a power supply cooling fan of a power supply of the computer system, and the vital temperature is obtained from an on-die thermal monitoring transistor of the CPU.

10. The method of claim 1 wherein setting the fan power is controlled by a relation stored in a random access memory or hard disk and accessible by an operating system during an operating system execution of the computer system.

11. The method of claim 1 wherein setting the fan power is controlled by a relation stored in a BIOS memory and accessible by a BIOS of the computer system during a POST or boot of the computer system.

12. A cooling system for a computer system, the cooling system comprising:

at least a cooling fan for providing cooling to the computer system;

a fan input-output module electrically connected to the fan for transmitting a control signal to the fan, the control signal controlling the rotational speed of the fan;

a chipset interface electrically connected to the fan input-output module for generating the fan control signal based on a change in a vital temperature of the computer system, and outputting the fan control

signal to the fan input-output module;

a controller electrically connected to the chipset interface for receiving the vital temperature and forwarding the vital temperature to the chipset interface; and

a temperature transducer for measuring the vital temperature and outputting the vital temperature to the controller.

13. The cooling system of claim 12 further comprising:

a memory electrically connected to the chipset interface for storing at least a relation relating the fan control signal to the vital temperature.

14. The cooling system of claim 13 wherein the memory is a random access memory or a hard disk and is accessible by an operating system of the computer system.

15. The cooling system of claim 13 wherein the memory is a BIOS memory accessible by a BIOS of the computer system during a POST or boot of the computer system.

16. The cooling system of claim 12 wherein the at least a cooling fan includes a CPU cooling fan of a CPU of the computer system and an auxiliary cooling fan of the computer system, and the temperature transducer is an on-die thermal monitoring transistor of the CPU.

17. The cooling system of claim 12 wherein the cooling fan is a power supply cooling fan of a power supply of the computer system, and the temperature transducer is an on-die thermal monitoring transistor of the CPU.

18. The cooling system of claim 12 wherein the at least a cooling fan includes a CPU cooling fan of a CPU of the computer system, an auxiliary cooling fan of the computer system, and a power supply cooling fan of a power supply of the computer system, and the vital temperature is obtained from an on-die thermal monitoring transistor of the CPU.

19. The cooling system of claim 12 further comprising a user interface electrically connected to the controller, the user interface comprising a display device and an input device for receiving control parameters from an external source; wherein the controller references the control parameters to generate the fan control signal.

20. A method for controlling an operating temperature of a computer system, the method comprising:

monitoring a rotational speed of a cooling fan installed in a power supply of the computer system, the rotational speed of the cooling fan being controlled by a fan power;

monitoring a vital temperature of the computer system; and

setting the fan power according to the vital temperature to control the rotational speed of the power supply cooling fan.

21. The method of claim 20 wherein setting the fan power further comprises:

increasing the fan power by a first power when the vital temperature increases by a first temperature, the first power being directly proportional to the first temperature.

22. The method of claim 20 wherein setting the fan power further comprises:

decreasing the fan power by a second power when the vital temperature decreases by a second temperature, the second power being directly proportional to the second temperature.

23. The method of claim 20 wherein setting the fan power further comprises:

maintaining the fan power when the vital temperature increases and the vital temperature is below a set temperature;

maintaining the fan power when the vital temperature remains constant and the vital temperature is above the set temperature; and

decreasing the fan power by a third power when the vital temperature remains constant and the vital temperature is below the set temperature.

24. The method of claim 23 further comprising resetting the fan power to a fixed fan power corresponding to a fixed fan speed when the set fan speed differs from the fixed fan speed and the vital temperature differs from the set temperature by at least a predetermined amount.

25. The method of claim 20 further comprising detecting a cooling fan maximum rotational speed and a corresponding maximum fan power such that setting the fan power is according to a percentage of the cooling fan maximum rotational speed.

26. The method of claim 20 wherein the vital temperature is obtained from an on-die thermal monitoring transistor of a CPU of the computer system.

27. The method of claim 20 wherein setting the fan power is controlled by a relation stored in a random access memory or hard disk and accessible by an operating system during an operating system execution of the computer system.

28. The method of claim 20 wherein setting the fan power is controlled by a relation stored in a BIOS memory and accessible by a BIOS of the computer system during a POST or boot of the computer system.

29. A cooling system for a computer system, the cooling system comprising:

a cooling fan installed in a power supply of the computer system;

a fan input-output module electrically connected to the fan for transmitting a control signal to the fan, the control signal controlling the rotational speed of the fan;

a chipset interface electrically connected to the fan input-output module for generating the fan control signal based on a change in a vital temperature of the computer system, and outputting the fan control signal to the fan input-output module;

a controller electrically connected to the chipset interface for receiving the vital temperature and forwarding the vital temperature to the chipset interface; and